PAN-PACIFIC ENTOMOLOGIST
65(2), 1989, pp. 166–171

Three New Grasshoppers from the Western United States (Orthoptera: Acrididae)

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Abstract.—Three new species of grasshoppers in two genera (*Paraidemona* Bruner, 1893 and *Oedaleonotus* Scudder, 1897) were discovered in the University of Arizona insect collection. These are described and incorporated into new keys of their respective genera.

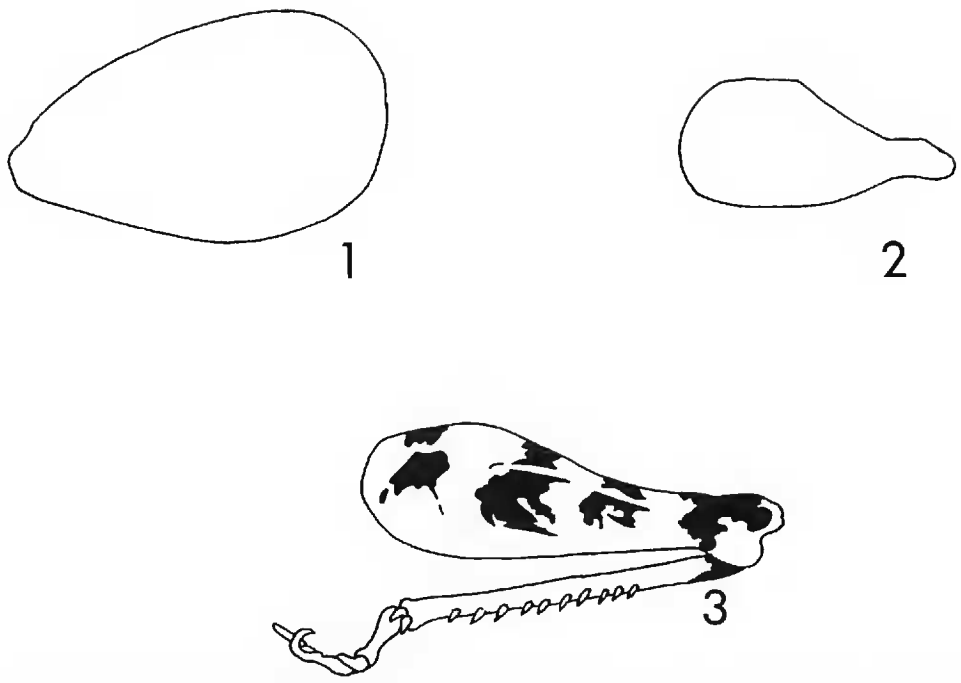
During the summer of 1987, the senior author of this contribution visited the United States and systematized the grasshoppers (Acrididae) in the University of Arizona, Department of Entomology, insect collection. Therein, he discovered three new species from the western United States. We describe these species below and present keys to *Paraidemona* Bruner, 1893 and *Oedaleonotus* Scudder, 1897 that incorporate the new species. Core references used to produce the descriptions and revised keys contained herein were in Hebard (1918, 1919, 1920), Rehn and Hebard (1912), Scudder (1898), and Strohecker et al. (1968).

Oedaleonotus werneri, NEW SPECIES
(Figs. 1–3)

Male.—Body small in size. Head shorter than pronotum. Frontal ridge slightly oblique. Antennae filiform, a little longer than head and pronotum combined. Pronotum with median carina, cut by three sulci, lateral carinae present, hind margin convex, not notched. Prosternal spine bluntly conical, nearly erect. Interval between mesosternal lobes longer than wide. Metasternal lobes separated narrowly. Tegmina lobiform, attingent, reaching to the middle of second abdominal tergite, a little longer than wide (Fig. 1). Tympanum present. Hind femur with smooth upper carinula. Hind tibiae with 10 or 11 inner spines and 9 or 10 outer spines, external apical spine absent. Epiproct triangular, length less than its basal width. Furcula small. Cerci very broad at base, abruptly narrowed, with pointed apex (Fig. 2). Subgenital plate short, without subapical tubercle, strongly dilated at base. Arolium longer than claws.

Body dark brown, with a black band from behind eyes backward to abdomen. Hind femur brown, with three distinct dark markings on the upper and outer sides, upper knee lobe (Fig. 3) black. Hind tibiae blue, basal part black.

Female.—Interval between mesosternal lobes wider than long. Metasternal lobes separated, broad. Tegmina separated, nearly cycloid, as long as wide. Ovipositor short, retracted.



Figures 1–3. *Oedaleonotus werneri,* n. sp. 1. Male tegmen, dorsal-lateral view. 2. Male cercus, lateral view. 2. Male femur-tibia, lateral view.

	Male	Female
Length of body (mm):	14.6–17.4	17.2–22.4
Length of pronotum (mm):	3.7–4.3	4.3–5.2
Length of tegmina (mm):	3.1–3.9	2.7–3.7
Length of hind femora (mm):	8.9–10.1	10.5–12.3

Holotype—male, allotype, paratypes—3 males and 6 females, 9 mi W Leeds, Utah, 6300 ft, VII.4.1949, F. Werner & W. Nutting.

Allied to *Oedaleonotus orientis* Hebard, 1920, but hind femur with three distinct dark markings, hind tibiae black at base and male tegmina attingent, a little longer than wide.

This species is named for Floyd G. Werner, Professor of Entomology and Curator of Insects at the University of Arizona in honor of his vast knowledge of southwestern U.S. insects and his abundant contributions in insect systematics. The holotype of this species will reside in the Academy of Natural Sciences, Philadelphia (ANSP).

Key to Species of *Oedaleonotus* Scudder, 1897

1(2). Tegmina as long as or longer than pronotum, sometimes reaching to apex of abdomen (Washington, Idaho, Nevada, Oregon, SW Arizona and California) ..... 1. *enigma* (Scudder), 1876

2(1). Tegmina shorter than pronotum, usually narrow and widely separated.

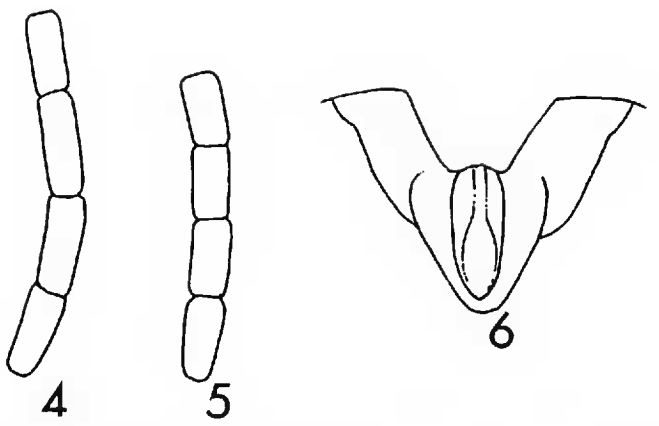
3(6). Hind margin of pronotum notched.

4(5). Lateral lobe of pronotum with buffy spot near first sulcus and lateral carinae (California) ..... 2. *phryneicus* Hebard, 1919

5(4). Lateral lobe of pronotum without buffy spot (California) ..... 3. *tenuipennis* (Scudder), 1897

6(3). Hind margin of pronotum not notched.

7(8). Male epiproct abruptly narrow near base, longer than its basal width (California) ..... 4. *pacificus* (Scudder), 1880



Figures 4–6. *Paraidemona nuttingi,* n. sp. 4. Male antennal segs. 7–10. 5. Female antennal segs. 7–10. 6. Male epiproct, dorsal view.

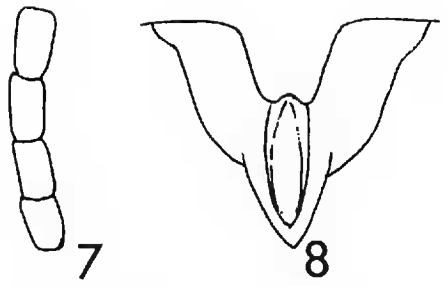
8(7). Male epiproct triangular, its length less than its basal width.
9(10). Hind margin of pronotum truncate (California, Oregon, Arizona, and Nevada) ..... 5. *borckii* (Stal), 1861
10(9). Hind margin of pronotum convex.
11(12). Tegmina attingent in female and overlapping in male (California) ..... 6. *pictus* (Scudder), 1899
12(11). Tegmina well separated, sometimes attingent in male.
13(14). Hind femur with three distinct dark markings, hind tibiae black at base. Tegmina attingent in male, slightly longer than wide (SW Utah) ..... 7. *werneri,* n. sp.
14(13). Hind femur with variable dark markings, hind tibiae not black at base. Tegmina well separated in male, much longer than wide (E California, Nevada, and Arizona) ..... 8. *orientis* Hebard, 1920

Paraidemona nuttingi **Yin, New Species**
(Figs. 4–6)

Male.—Body rather robust. Head shorter than pronotum, the vertex well rounded, interspace between eyes as broad as the first antennal segment. Frontal ridge oblique, frontal costae nearly parallel, flat above, sulcate below. Eyes oval. Antennae filiform, much longer than head and pronotum together, middle antennal segments (7–10) long, length three times width. Pronotum slightly notched at both extremities, median carina low, lateral carinae wanting, prozona 2.2 times metazona. Prosternal spine bluntly conical, erect. Interval between mesosternal lobes longer than broad. Metasternal lobes attingent. Apterous. Tympanum absent. Upper carinula of hind femur smooth. Hind tibiae with 10 inner spines and 9 or 10 outer spines, external apical spine absent. Arolium longer than claws. Epiproct triangular, its lateral sides waved, apex pointed (Fig. 6). Furcula attingent very long and broad, more than a third as long as epiproct and more than a third as broad as the basal width of epiproct. Cerci conical, pointed, half as long as epiproct.

Body yellowish green, lateral dark band indistinct. Hind femur greenish yellow, upper knee lobe black. Hind tibiae glaucous.

Female.—Larger than male. Interspace between eyes rather broader than first antennal segment. Antennae as long as the head and pronotum together, middle antennal segments (7–10) long, length 2.5 times width (Fig. 5). Arolium shorter than claws. Ovipositor valves short, apex hooked.



Figures 7, 8. *Paraidemona olsoni,* n. sp. 7. Male antennal segs. 7–10. 8. Male epiproct, dorsal view.

	Male	Female
Length of body (mm):	17.7	22.3–24.2
Length of pronotum (mm):	3.6	4.4–4.6
Length of hind femora (mm):	9.3	11.5–12.0

Holotype—male, allotype (pair on same pin), paratypes—1 male, 1 female (on same pin), Laredo, Webb Co., Texas, V.20–24.1949, W. Nutting.

The new species is allied to *Paraidemona mimica* Scudder, 1898 and *Paraidemona fratercula* Hebard, 1918, but furcula very long, more than a third as long as epiproct and hind femur without dark band on the upper side and black stripe on the outer face.

This species is named for William L. Nutting, Professor Emeritus of Entomology, at the University of Arizona in recognition of his outstanding contributions to our knowledge of southwestern U.S. Isoptera and Orthoptera. The holotype of this species will reside in the ANSP.

Paraidemona olsoni **Yin, New Species**
(Figs. 7, 8)

Male.—Body small in size. Head not prominent, shorter than pronotum, the vertex well rounded, interspace between eyes as broad as the first antennal segment. Frontal ridge oblique, frontal costae nearly parallel, antennae filiform, longer than head and pronotum together, middle antennal segments short, length less than two times width (Fig. 7). Pronotum truncate at both extremities, with slight median carina, lateral carinae absent, prozona 2.5 times metazona. Prosternal spine moderate, blunt, conical, erect. Interval between mesosternal lobes longer than broad. Metasternal lobes narrowly attingent. Apterous. Tympanum absent. Hind femur robust, upper carinula smooth. Hind tibiae with 10 or 11 inner spines and 9 outer spines, external apical spine absent. Arolium longer than claws. Subgenital plate short, blunt. Epiproct triangular, with waved sides, apex pointed (Fig. 8). Furcula consisting of a pair of parallel, attingent, cylindrical processes, more than a third as long as the supraanal plate. Cerci conical, pointed, half as long as the supraanal plate.

Body yellowish testaceous, with a broad lateral dark band which extends from behind eye backward to abdomen. Hind femur greenish yellow, without dark band or stripe, upper knee lobe black. Hind tibiae glaucous.

Female.—Interspace between eyes rather broader than first antennal joint. Antennae shorter than head and pronotum together. Arolium shorter than claws. Ovipositor valves short, apex hooked.

	Male	Female
Length of body (mm):	14.5–16.1	20.5–21.3
Length of pronotum (mm):	2.7–3.1	3.6–4.0
Length of hind femora (mm):	8.4–8.9	9.9–11.0

Holotype—male, allotype, paratypes—4 males and 2 females, Olivia, Calhoun Co., Texas, V.18.1948, W. Nutting; 1 female, Port Arthur, Jefferson Co., Texas, V.17.1948, W. Nutting; 1 female and 1 male, Brownsville, Texas, IX.7.1949, W. Nutting.

Close to *Paraidemona nuttingi,* n. sp., it differs from the latter in its smaller body, short middle antennal segments (length <2 times width) and furcula less than a third basal width of supraanal plate.

This species is named for Carl Olson, Insect Curatorial Assistant at the University of Arizona in recognition of his dedication to service in insect systematics. The holotype of this species will reside in the ANSP.

Key to Species of *Paraidemona* Bruner, 1893

1(2). Supraanal plate of male, excepting the tip, subquadrate, the lateral margins rectangulate (Dallas, Dallas Co., Texas) . . . . . 1. *punctata* (Stal), 1878

2(1). Supraanal plate of male with pointed tip.

3(4). Supraanal plate of male with nearly straight sides (Fort Worth, Tarrant Co.; Columbus, Colorado Co.; Uvalde, Uvalde Co., Texas; Mexico) . . . . . 2. *mimica* Scudder, 1897

4(3). Supraanal plate of male with waved sides.

5(6). Furcula of male separated (Brownsville, Cameron Co., Texas) . . . . . 3. *latifurcula* Hebard, 1918

6(5). Furcula of male attingent.

7(10). Furcula of male more than a third as long as the supraanal plate.

8(9). Body larger, middle antennal segments long, length 2.5–3 times width, furcula more than a third as wide as basal width of epiproct (Laredo, Webb Co., Texas) . . . . . 4. *nuttingi,* n. sp.

9(8). Body smaller, middle antennal segments short, length less than 2 times width, furcula less than a third as wide as basal width of epiproct (Port Arthur, Jefferson Co.; Olivia, Calhoun Co.; Brownsville, Cameron Co., Texas) . . . . . 5. *olsoni,* n. sp.

10(7). Furcula of male very small, short (Lyford, Cameron Co.; Laredo, Webb Co.; Floresville, Wilson Co., Texas) . . . . . 6. *fraterula* Hebard, 1918

Acknowledgments

We thank the Academy of Natural Sciences in Philadelphia and Dan Otte for receiving and processing the holotypes and Gene Hall for producing illustrations. This is Arizona Agric. Exp. Sta. MS No. 7012.

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